



## **Prevalence of Malignancy in Solitary Thyroid Nodule-A Retrospective Study**

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### **Authors' contributions**

*This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.*

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### **ABSTRACT**

**Background:** Solitary thyroid nodule is defined as discrete mass palpable in an otherwise apparently normal thyroid gland. Solitary nodule is the common presentation of thyroid disorders.

**Objective:** This study aimed to look into the prevalence of malignancy in clinico-radiologically detected solitary thyroid nodule and to correlate the findings in pre-operative fine needle aspiration cytology(FNAC) and post-operative histopathological examination(HPE).

**Materials and Methods:** A retrospective study was carried out in our Institute for a period of 6 months using the data obtained between 2018-2020 of patients who were clinically and radiologically diagnosed as solitary thyroid nodule in the Department of General Surgery.

**Results:** Out of 30 cases of clinically detected solitary thyroid nodule 7(23.3%)cases was found to be malignant. The mean age of presentation was 41.2 years with male female ratio of 1:9. 25(83.3%)cases was reported as benign nodules according to pre-operative FNAC out of these 2(6.6%)cases turned out to be malignant on post-operative histopathological examination.

**Conclusion:** It is concluded that from the present study the prevalence of malignancy in clinically detected solitary thyroid nodule is 23.3%. FNAC being sensitive, cost effective and reliable tool in the preoperative assessment of solitary thyroid nodules and HPE in post operative evaluation of clinical specimen both playing a vital role in management of solitary thyroid nodule thus helping in early diagnosis and proper surgical intervention.

**Keywords:** FNAC; HPE; Malignancy; solitary thyroid nodule.

## 1. INTRODUCTION

The most common clinical manifestation of thyroid disorders is usually a thyroid nodule. Solitary thyroid nodule is defined as discrete palpable mass in an otherwise apparently normal gland [1]. Majority of diseases associated to thyroid gland may present as solitary thyroid nodule (STN). Solitary thyroid nodules are common among adults and accounts up to 4-7% of general population. It is seen more commonly in females (6.4%) compared to males (1.5%). In majority clinically detected cases of solitary thyroid nodules are actually found to be hyperplastic nodules in multinodular goitres [2].

Incidence of malignancy ranges from 10% to 30% in solitary thyroid nodule (STN). Studies have shown that the occurrence of malignancy is higher in case of solitary thyroid nodule compared to multinodular goitres. Preoperative evaluation of thyroid nodules plays an important role in distinguishing between benign and malignant thyroid nodules and also in treatment so unnecessary extensive surgery and its related adverse effects such as hypothyroidism, hypocalcemia and recurrent laryngeal nerve injury can be avoided [3,4].

The present study is aimed to study the prevalence of malignancy in solitary thyroid nodule and also to correlate the findings of preoperative FNAC and postoperative histopathological examination (HPE).

## 2. METHODOLOGY

### 2.1 Study Design

This is a retrospective study.

### 2.2 Study Area and Population

The study was conducted in Saveetha Medical College and Hospital, Thandalam, Chennai and patients who have been previously diagnosed and treated for solitary thyroid nodule in the Department of Surgery in our Institute were included.

### 2.3 Sampling Technique

Convenient sampling based on eligibility criteria.

### 2.4 Study Period

The study was carried out for a period of 6 months between January 2021 to June 2021.

### 2.5 Inclusion Criteria

All patients with solitary thyroid nodules detected clinically and confirmed by ultrasound.

### 2.6 Exclusion Criteria

Patients who were diagnosed with more than one nodules detected on ultrasound.

### 2.7 Study Procedure

A retrospective study was carried out for a period of 6 months using the data collected from the Department of General Surgery between 2018-2020 of patients who were diagnosed with solitary thyroid nodule both clinically including laboratory investigations-blood routine, urine routine, fasting blood sugar, T3, T4, free T3, free T4, and thyroid stimulating hormone estimation and confirmed by ultrasound findings showing the nodule size, multinodularity, solid or cystic, microcalcifications and enlarged cervical lymph nodes. Both preoperative FNAC and postoperative HPE reports were obtained and were evaluated statistically and correlated with clinical diagnosis.

### 2.8 Statistical Analysis

Data entry was done and analysed using Microsoft Excel 2007. The descriptive statistics were calculated and tabulated on the basis of objectives of the study.

## 3. RESULTS

This was a retrospective study carried out at Saveetha Medical College, Thandalam, Chennai over a period of 6 months between January 2021 to June 2021. A total of 30 cases of clinically diagnosed solitary thyroid nodule were identified in which 3 (10%) were males and 27 (90%) were females. Sex distribution shows majority were females with a male female ratio of 1:9. Age of patients ranged from 20-69 years with a mean age of 41.2 years (Table 1).

Preoperative ultrasound neck findings is shown in Table 2, it includes nodule size, nodule echogenicity, presence of calcifications, nodule shape and nodule margin.

**Table 1. Distribution of solitary thyroid nodule according age and sex**

Age(in years)	Male (%)	Female (%)	n(%)
20-29	0	3(10)	3(10)
30-39	0	9(30)	9(30)
40-49	1(3.3)	7(23.3)	8(26.6)
50-59	2(6.6)	4(13.3)	6(20)
60-69	0	4(13.3)	4(13.3)
Total	3(10)	27(90)	30(100)

**Table 2. Preoperative ultrasound neck findings**

USG Neck Finding	n
Nodule size	
<2	5
2-4	22
>4	3
Nodule echogenicity	
Isoechoic	16
Hyperechoic	11
Hypoechoic	2
Cystic	1
Calcifications	
Microcalcifications	1
No calcification	29
Nodule shape	
Wide than taller	18
Taller than wider	1
No difference	11
Nodule margins	
Halo and regular	23
No halo and regular	6
No halo and irregular	1

**Table 3. Bethesda system of thyroid cytopathology reporting**

BI	Non-diagnostic/inadequate
BII	Benign
BIII	Atypical or follicular lesion with undetermined significance
BIV	Follicular neoplasm
BV	Suspicious of malignancy
BVI	Malignant

The preoperative cytopathology findings according to Bethesda system of thyroid cytopathology reporting is shown in Table 3, Table 4. In pre-operative FNAC, out of 30 cases non-neoplastic lesions were seen in 25(80%)cases, follicular neoplasm in 1(3.3%)case,suspicious of malignancy was seen in 3(10%)cases and malignant cytology in 1(3.3%)case.

Depending on clinical presentation i.e swelling, pain,discomfort and FNAC features these 30 patients underwent surgery for solitary thyroid nodule. Among them 25 patients had undergone

hemithyroidectomy and 5 cases underwent total thyroidectomy.

The FNAC results were compared with corresponding histopathological diagnoses as shown in (Table 5).According to pre-op FNAC 25(83.3%) cases were benign of which 2(6.6%)cases turned out to be malignant on postoperative histopathology as shown in (Table 6) and completion thyroidectomy was performed for these cases.

On postoperative histopathological examination papillary carcinoma was the most common

malignancy seen in 6(85.7%) cases followed by follicular carcinoma in 1(14.2%) case.

#### 4. DISCUSSION

Solitary thyroid nodule is defined clinically as localised enlargement of thyroid gland in an apparently normally remaining gland. The incidence of solitary thyroid nodules is more common among adults in general population [5]. Thyroid enlargement can be either diffuse or nodular type, this necessitates that several investigations are required to rule out the possibility of benign or malignant [6]. Therefore the present study is aimed to find out the incidence of malignancy in solitary thyroid nodule as appropriate surgical interventions can reduce the rates of morbidity and mortality.

In this study the mean age at presentation is found to be 41.2 years which is nearly similar to the studies done by Fernando et al. [3], Talepoor et al. [7] and Anwar et al. [8] showing 37.2 years, 38.6 years and 37 years respectively.

In our study ratio of sex incidence was found to be 1:9 which correlates with the studies done by Dorairajan et al. [9] and Fernando et al. [3] i.e 1:9 and 1:11.5 respectively. Because of periods of swing in the demands of the hormonal requirement in female during various phases

(puberty, menstrual cycles, pregnancy, and menopause) of their life cycle the chances of thyroid nodule formation are high in comparison to male.

The importance of FNAC and its accuracy in early diagnosis of thyroid enlargement and also in differentiating benign and malignant thyroid nodules has been shown in many studies. Hence in our study also all the clinically diagnosed solitary thyroid nodules were subjected to FNAC. In the present study according to pre-op FNAC out of 30 cases 80%(24) were benign and 13.3%(4) were suspicious of malignancy and 3.3%(1) was malignant. Similar results was shown in studies done by Rao et al. [1] showing benign 61.6% , 26.1% suspicious and 4.1% malignant cases and Sirry et al. [10] reporting 96.7% benign and 3.3% malignant cases respectively.

Solitary thyroid nodules with presence of any cytological suspicion or malignancy will definitely require surgical intervention. So Hemithyroidectomy was performed for all benign cases according to FNAC and then clinical specimen were evaluated by HPE and then completion thyroidectomy was performed for those cases which were found to be malignant. Total thyroidectomy was performed for all malignant cases.

**Table 4. Pre-operative cytopathology finding**

FNAC	Male (%)	Female (%)	n(%)
BI	0	0	0
BII	1(3.3)	24(80)	25(83.3)
BIV	0	1(3.3)	1(3.3)
BV	2(6.6)	1(3.3)	3(10)
BVI	0	1(3.3)	1(3.3)
Total	3(10)	27(90)	30(100)

**Table 5. Pre-operative FNAC and Post-operative HPE findings**

Pre-op FNAC	Post-op HPE	
	Benign	Malignant
Benign	25(83.3%)	2(6.6%)
Suspicious/Follicular neoplasm	4(13.3%)	4(13.3%)
Malignant	1(3.3%)	1(3.3%)

**Table 6. Findings of Histopathological diagnosis**

HPE diagnosis	Male (%)	Female (%)	n (%)
Papillary thyroid carcinoma	2(28.5)	4(57.1)	6(85.7)
Follicular thyroid carcinoma	0	1(14.2)	1(14.2)
Total	2(33.3)	5(71.4)	7(100)

Post-operative HPE report in our study showed 23.3%(7) malignant cases which was nearly similar to the incidence report according to Rao et al. [1] and Anitha et al. [2] showing 16.5% and 18.5% respectively.

## 5. CONCLUSION

Thus our study shows that the prevalence of malignancy in solitary thyroid nodule is around 23.3% being a non-endemic area. The given percentages are from clinically detected solitary thyroid nodules which were operated and not from all the examined thyroid nodules. Majority of these solitary thyroid nodules were benign and 23.3% cases being malignant, papillary carcinoma is the commonest constituting 85.7%. FNAC being sensitive, specific and cost effective and reliable tool in initial diagnosis for preoperative assessment of solitary thyroid nodules and HPE in post operative evaluation of clinical specimen to rule out malignancy both playing a vital role in management of solitary thyroid nodule thus helping in early diagnosis and proper surgical intervention reducing the rates of mortality and morbidity.

## CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline /Patient's consent and ethical approval has been collected and preserved by the authors.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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